A CASE STUDY AND COMPARATIVE STUDY OF TWO GREEN BUILDING

Bhawana Rathi¹ and Jyoti Singh²
¹M. Tech Student, ²Assistant Professor
Department of Civil Engineering, School of Engineering & Technology,
Noida International University, Greater Noida, U.P., India

ABSTRACT: Green building technology is one of the most trending topics all over the world which is been put forward to reduce the significant impact of the construction industry on the environment, society and economy. The globe is in an urgent need of sustainable and a smart development as the problem of pollution and global warming is rapidly increasing all over the world. Many problems have been noticed due to increase in the green house gases. In the developed and developing countries is recommends durable and eco friendly materials for making the sustainable constructions. This study discusses the importance of eco friendly materials and techniques to overcome the problems related to construction of the buildings. In this study, select the two green building in the national capital region (NCR) and comparative analysis by techniques, construction materials and sustainability of the buildings.

Keywords: Green Buildings, Materials, Sustainability

I. INTRODUCTION

Buildings have a tremendous impact on the environment, using about 40% of natural resources extracted in industrialized nations [1], consuming virtually 70% of electricity and 12% of potable water [2], and producing between 45% and 65% of the waste disposed in our landfills [3]. At the same time the construction industry has significant economic, environmental and social impacts on the society. These effects are to a great extent observed amid the lifecycle of the built structures. Likewise, there are certain and in addition negative effects of development exercises on the general public. A portion of the constructive effects incorporate furnishing structures and territories alongside the offices to fulfill the human prerequisites, giving work to the general population of the country lastly, contribute towards the economy of the country. There have been a considerable measure of research works did on the parts of the green working in various settings however they all need in orderly surveys of the current material of information. The precise research is essential to recognize the basic research issues and furthermore feature the future research technique. Mr. Jiau Zuo and Mr. Zhen Yu Zhao carried out their research work on the green building technology and also stated the current status and also the future agendas for the same. They presented a report on a critical review of the existing body of knowledge of researches related to green building. These effects are to a great extent observed amid the lifecycle of the built structures. Likewise, there are certain and in addition negative effects of development exercises on the general public. A portion of the constructive effects incorporate furnishing structures and territories alongside the offices to fulfill the human prerequisites, giving work to the general population of the country lastly, contribute towards the economy of the country. There have been a considerable measure of research works did on the parts of the green working in various settings however they all need in orderly surveys of the current material of information. The precise research is essential to recognize the basic research issues and furthermore feature the future research technique. Ries; Robert Bilec; Melissa M Gokhen; Nurvi Mehmet Needy and Kim Lascola had distributed a paper on the financial advantages of green structures which was an extensive report which was upheld with a contextual analysis .they expressed that in building plan and developments both the green building and standard development systems are considered for some, building venture. their exploration researched the connection between the composite regular and green building highlights which would add to the advancement of the green building measurements.

II. GREEN BUILDING DEFINITIONS

Public concerns about the effects of the development business on human wellbeing and vitality utilize, and worldwide environmental changes have made GB a mainstream field of research (US Green Building Council (USGBC) Research Committee, 2008). As per the literature, economical structures, superior structures, green development and ecofriendly materials and strength and age of the structure is high are been utilized as a part of the structures (Kats, Alevantis, Berman, Mills, & Perlman, 2003; Kibert, 2012). According to Kibert (2012, p. 1), “the result of applying maintainable development ways to deal with making a mindful fabricated condition is most normally alluded to as superior green structures, or essentially, green structures. The GB approach, dissimilar to the regular (non-green) building approach, goes for planning, developing, and working a working with insignificant utilization of assets. According to the Hong kong green building council suggests that limit the
troublesome effects of structure on the conditions with employments of productive assets, arranging of structures, utilizes waste and reduction of pollution.

III. IGBC RATING SYSTEM

The Indian Green Building Council (IGBC) was formed in the year 2001 by Confederation of Indian Industry (CII). The aim of the council is to bring green building movement in India and facilitate India to become one of the global leaders in green buildings by 2015 IGBC has developed green building rating programmers to cover commercial, residential, factory buildings, etc as tabulated in Table 3.1. Each rating system divided into different levels of certification is as follows in Table 3.2.

Table 3.1: Rating system divided into different levels of certification

<table>
<thead>
<tr>
<th>Certification Level</th>
<th>Owner occupied buildings</th>
<th>Tenant buildings</th>
<th>Recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Certified</td>
<td>50-59</td>
<td>50-59</td>
<td>Good practices</td>
</tr>
<tr>
<td>Silver</td>
<td>60-69</td>
<td>60-69</td>
<td>Best</td>
</tr>
<tr>
<td>Gold</td>
<td>70-79</td>
<td>70-79</td>
<td>Outstanding performance</td>
</tr>
<tr>
<td>Platinum</td>
<td>80-89</td>
<td>80-89</td>
<td>National Excellence</td>
</tr>
<tr>
<td>Super Platinum</td>
<td>90-100</td>
<td>90-100</td>
<td>Global Leadership</td>
</tr>
</tbody>
</table>

Table 3.2: Rating system divided into different levels of certification

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Criteria Points</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Sustainable Architecture and Design</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Site selection and planning</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>Water conservation</td>
<td>18</td>
</tr>
<tr>
<td>4</td>
<td>Energy efficiency</td>
<td>28</td>
</tr>
<tr>
<td>5</td>
<td>Building materials and resources</td>
<td>16</td>
</tr>
<tr>
<td>6</td>
<td>Indoor environmental quality</td>
<td>12</td>
</tr>
<tr>
<td>7</td>
<td>Innovation and development</td>
<td>7</td>
</tr>
</tbody>
</table>

IV. STUDY AREA

There are two building selected for the comparative analysis based on the quality of the materials, which type of material used, energy efficiency. The first building is situated in the gurugram and another second building (Vihan Shopping Plaza) situated in Ghaziabad.

Table 4.1: Details of the comparative study of the buildings

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Items</th>
<th>Green building (Nokia Gurugram)</th>
<th>Conventional building (Vihan Shopping Plaza)</th>
<th>Profit of Green Building</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>cement</td>
<td>PPC</td>
<td>OPC</td>
<td>• PPC is higher durability of concrete structure due to less permeability of water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Better workability</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Low heat of hydration</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>• Better surface finish</td>
</tr>
<tr>
<td>2</td>
<td>Brick</td>
<td>Fly ash brick</td>
<td>Clay brick</td>
<td>• Specific gravity :-</td>
</tr>
</tbody>
</table>
### V. CONCLUSION

The conclusions that can be drawn from this comparative study of the green buildings situated at National Capitol Region which are as follows:-

- As per the study, initial cost of the green building is high but it gives benefits in energy consumption, low electricity bill and age of the structure.
- There is no facility in the conventional buildings for the green structures
- Mostly uses eco-friendly materials, cementitious wastages, recycles materials should be use to reduce the effect on the environment.

### VI. RECOMMENDATIONS

- Suitable control measures need to be adopted urgently in the city before it is too late. Here are some recommendations:
  
  - The benefits of green design to society in general, and building owners and users in particular, are manifold. The construction of such buildings results in reduced destruction of natural habitats and bio-diversity, reduced air and water pollution, less water consumption, limited waste generation and increased user productivity.
  
  - With increasing threat on our planet earth caused by depleting resources and increasing emissions it is absolutely pertinent that all our future buildings should be designed to function as “green buildings.”
REFERENCES


[4]. The economic benefits of a green building; Ries, Robert Bilec, Melissa Gokhan

[5]. Jian Zuo and Zhen Yu Zhao (2013), Renewable and sustainable energy reviews-ELSEVIER


